DE 3,545,926 A1

Job No.: 1505-89032
Translated from German by the Ralph McElroy Translation Company
910 West Avenue, Austin, Texas 78701 USA

FEDERAL REPUBLIC OF GERMANY
GERMAN PATENT OFFICE
PATENT NO. 35 45 926 A1
(Offenlegungsschrift)

Int. Cl.[4]:	D 06 N 7/00 A 61 J 3/07 A 47 L 13/17 A 41 B 13/02
Filing No.:	P 35 45 926.3
Filing Date:	December 23, 1985
Date Laid Open to Public Inspection:	July 2, 1987

CLOTH, ETC. WITH INTEGRATED CAPSULES CONTAINING AN ACTIVE SUBSTANCE

Applicant:	Allan Gerhard Frühauf 8047 Karlsfeld, Germany
Inventors:	Same as the applicant
Agents:	E. Zipse 7570 Baden-Baden H. Habersack, Patent Attorneys, 8000 Munich

Search results according to Section 43, Paragraph 1, Patent Act:

DE-OS	30 28 808
GB	6 31 484
US	42 01 822
US	32 57 254
US	23 18 718

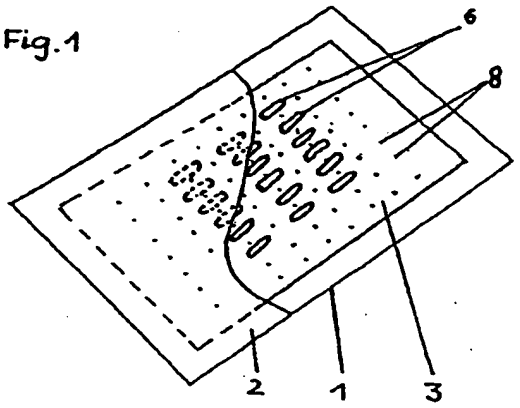
Examination request according to Section 44, Patent Act has been filed.

Abstract

Cloth, nonwoven fabric, film, paper, etc., made of natural or synthetic substances, in which integrated capsules containing an active substance which can be burst under applied stress are contained. Depending on the application case, gases, liquids, and solids, such as dyes,

adhesives, and fragrances, medications, solvents, and the like can be encapsuled as the active substance. A separation layer (3), which is essentially impermeable to the active substance, ensures that the active substance exiting from the burst capsules exits in a predetermined direction with respect to the separation layer. The capsules are integrated into the separation layer (3) as indentations (6). Break or attenuation sites are provided for the exiting of the active substance on the desired side of the separation layer (3).

Fig.1



Claims

1. Cloth, nonwoven fabric, film, paper, or the like made of natural substances or synthetic substances with integrated capsules containing an active substance which can be burst under applied stress, wherein a separation layer (3), which is essentially impermeable to the active substance, is arranged, characterized in that the capsules (2) are embedded in this separation layer or make up the layer, in that the capsules have break or attenuation sites in such an arrangement, and in that the active substance exits in a predetermined direction with respect to the separation layer.

2. Cloth according to Claim 1, characterized in that the capsules (2) are in the form of rods or tubes.

3. Cloth according to Claims 1 or 2, characterized in that the separation layer contains a base film with the active substance-holding, capsule-forming indentations and a cover film, which are bound together, for example, by fusing.

4. Cloth according to Claim 3, characterized in that indentations are formed on both sides of the base film, which is closed on both sides by a cover film.

5. Cloth according to one of Claims 1 to 4, characterized in that different active substances are contained in, particularly, indentations, which open in different directions.

6. Cloth according to one of Claims 3 to 5, characterized in that the base and cover film have different thicknesses and/or are made of materials with different tear strengths.

7. Cloth according to Claim 6, characterized in that indentations are formed only in predetermined areas of the base film and that the cover film is spread out only over these areas.

8. Cloth according to one of Claims 3 to 7, characterized in that the break or attenuation sites on the connecting sites of the base and cover films are provided along the edges of the indentation, whether the base or cover films tear there with stress or the cover film detaches from the base film with stress and in this way, an exit opening for the active substance is formed.

9. Cloth according to one of Claims 1 to 8, characterized in that the separation layer is covered on one or both sides by, for example, an absorptive material, which is suited to the given application.

10. Cloth according to Claim 9, characterized in that the material protrudes laterally over the separation layer.

The invention concerns a cloth, etc. with capsules containing an active substance and integrated therein, in accordance with the preamble of Claim 1.

In Kondo Asaji: Microcapsule Processing and Technology, Marcel Dekker, New York 1979, pages 18-26, such cloths, etc. with embedded or layered microcapsules are described. Active substances held in the microcapsules may include, depending on the given application, gases, liquids, and solids, such as dyes, adhesives, fragrances, medications, solvents, and so forth. The capsule size can be a few μm to 2-3 mm.

Upon bursting due to mechanical action, the microcapsules release the active substance uncontrolled in all directions. However, in many application, it is desirable that the active substance be allowed to exit only from one side, in order, e.g., to keep the back side of the cloth dry. It is therefore necessary to incorporate the separation layers into the cloth.

The object of the invention is a cloth, etc. of the required type, which as a result of its structure, combines simple production feasibility with a versatile development capacity.

This objective is realized, in accordance with the invention, by a cloth, etc., as is characterized in Claim 1. Refinements of the invention are described in the subordinate claims.

The cloth according to the invention has a separation layer, so that the active substance exits after the capsules are burst in the preferred direction with respect to this separation layer. The capsules containing the active substance are directly embedded in this separation layer. With positions in which they are appropriately close to one another, they also directly make up this separation layer as a cohesive mat. An appropriate arrangement of break or attenuation sites on the capsules ensures that the active substance exits from one side or the other of the separation layer. It is also possible to allow one active substance to exit from one side of the separation layer and another active substance from the other side of the separation layer.

The separation layer is advantageously a base film with the active substance-holding, capsule-forming indentations, over which a cover film is drawn and, is affixed, for example, by fusing or adhesion. The fact that the base and the cover films have different thicknesses or are made of materials with different tear strengths ensures that the capsules will burst in a preferred direction and there release the active substance. Indentations can be formed on both sides of the base film and can be closed, on both sides, by a cover film. This refinement of the invention is particularly suitable if different active substances are to be released from both sides of the separation layer.

The bursting of the capsules takes place, in particular, as a result of mechanical stress. The release of the active substance(s) can, however, be effected chemically, in that among the active substance capsules, a few capsule pairs are also admixed, which contain substances with the characteristic that upon colliding, the shells of the active substance capsules are weakened or dissolved.

The capsules should generally have such a volume that the exiting active substance not only acts locally, but also moistens, wets, or soaks a greater area of the cloth. Therefore, capsules in a rod or tube form are preferred.

In the production of the separation layer, consisting of a base film and a cover film, the weak sites generally appear at the points where the base and cover films are joined, along the edges of the indentation, so that with mechanical stress there, the base and cover films tear. The joining of the base and cover films, however, can also be produced in such a way that with mechanical stress, the cover film detaches from the base film, and, in this way, the active substance can penetrate between the two and can exit through an exit opening in the cover or base films.

For some application cases, it may be desirable to limit the arrangement of active substance capsules to partial areas of the cloth, if, for example, moist wiping is to be carried out first with a cleaning or polishing cloth, followed by drying. This is to be implemented simply with the cloth according to the invention, in that indentations are formed only in specific areas of the base film. Then, it will be necessary to spread out the cover film only over these areas.

The separation layer can already be made of a material corresponding to the pertinent application case. Frequently, however, with regard to this material, special characteristics, such as absorption capacity, are required, so that it is expedient to cover the separation layer, on one or both sides, with a material appropriate to the application purpose. This cover material can protrude laterally over the separation layer.

The base and the cover film can be produced from the usual film materials, such as polyethylene or polypropylene, as they are known from the packaging industry or as freshness-

preservation films from the food industry. Their thickness should be in the micrometer range, so that they offer little bending resistance and can be easily crumpled.

The invention will be explained in more detail below with the aid of the appended drawings. They show:

Figure 1, in perspective view, a cloth according to the invention, with embedded capsules;

Figure 2, partial cross-sections of various embodiments of a cloth according to the invention; and

Figures 3 and 4, two schematized possibilities for producing a cloth according to the invention.

In accordance with Figure 1, the cloth, nonwoven fabric, etc., in accordance with the invention, is composed of a lower and an upper cover material 1 and 2, which is, for example, absorbent, and a separation layer 3. The separation layer 3, in turn, consists of a base film 4 and a cover film 5, which are fused or adhesed together. Indentations 6 to hold the active substance 7, corresponding to the application purpose, are formed in the base film 4. The mostly fibrous cover materials 1 and 2 can be cemented or hooked up mechanically with one another along the edge which protrudes over the separation layer 3, wherein a reciprocal bonding of the two cover materials can be attained by perforation holes 8 in the separation layer 3.

As shown in Figure 2, the indentations 7 can be spherical or rod-shaped. Depending on which side the active substance 7 is supposed to exit, the base or cover films are formed to be stronger or weaker. The bursting will take place in the attenuated sites 9 along the indentation edges. If neither the base nor the cover films are intended to burst when mechanical stress is applied, but rather the two are detached from one another, then the active substance 7 can penetrate between the two and exit through perforation holes 8 into the cover material 1 or 2.

Figure 3 shows a first production principle for the separation layer 3 of a cloth according to the invention. The base film 4 is supplied by a drum 11, and the cover film 5 by another drum 15. As the thermoplastic base film 4 is passes between rollers 12 and 13, which have corresponding projections and depressions, indentations 6 are pressed into it, appropriately after prior heating. The active substance is sprayed into the indentations 6 by a spray device 17. The cover film 5 coated with an adhesive at 18 is pressed onto the base film 4 between the rollers 13 and 14. After the subsequent supply of the cover materials 1 and 2, the cloth is wound on the drum 16.

In accordance with the second production principle shown in Figure 4, the base and cover film are brought together from drums 21 and 22, in the form of a funnel, downwards between the rollers 23 and 24. The active substance is sprayed from a spray device 28 between the two films. The rollers 23 and 24 fuse the films in several longitudinal sheets 29, wherein the rollers 25 and

26 place transverse welding seams 30, so that the active substance is enclosed in cushion-like formations 31. After applying the cover materials 1 and 2, the cloth, nonwoven fabric, etc. is wound on the drum 27.

Fig. 1

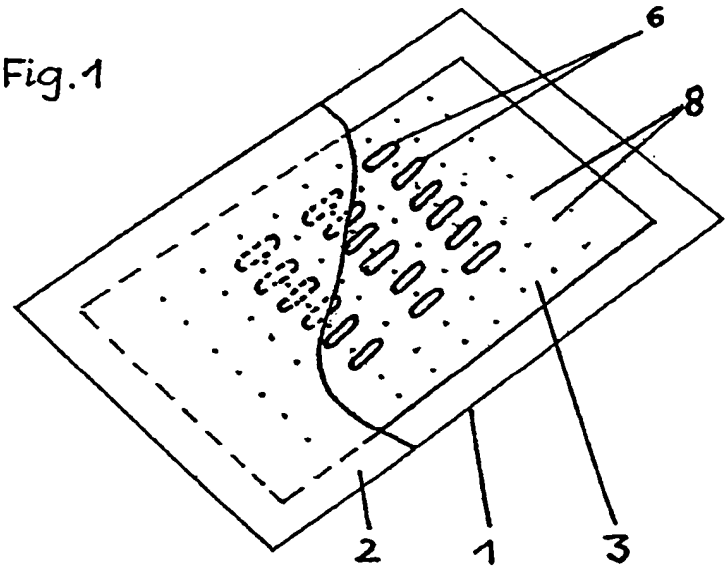


Fig. 2

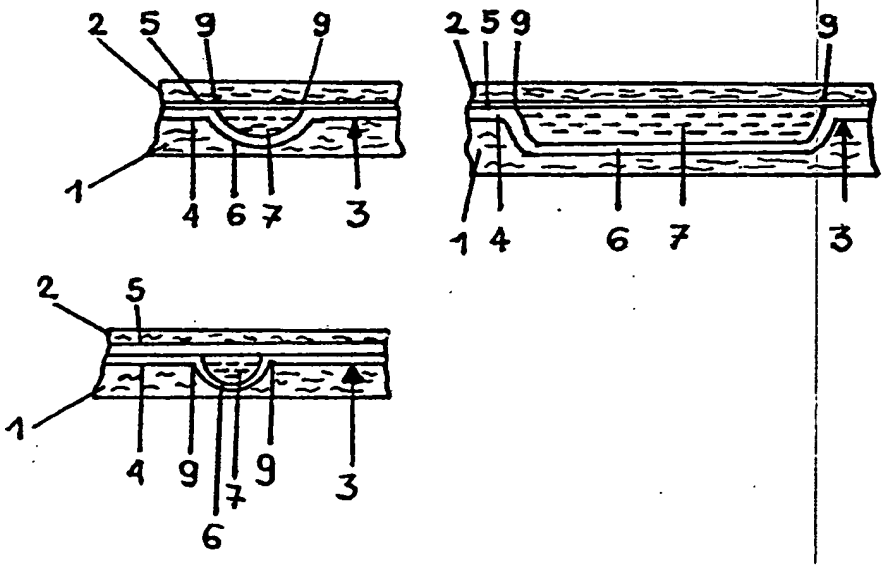


Fig.3

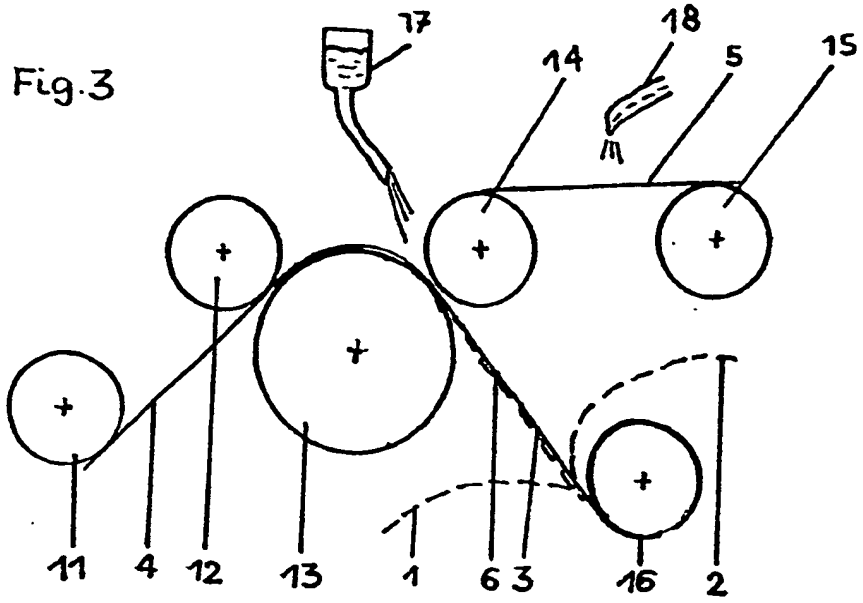


Fig.4